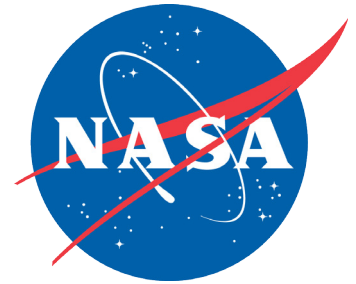


Spaceport News

John F. Kennedy Space Center - America's gateway to the universe



NEW DISCOVERIES, NEW FRONTIERS DRIVE FY 2014 BUDGET

Cabana: Proposal clarifies mission

By Steven Siceloff
Spaceport News

Kennedy Space Center will have a leading role in NASA's plans to capture an asteroid and launch astronauts to explore it, the center's director told employees shortly before the agency's 2014 budget proposal was released.

"It does everything that needs to be done as far as developing the technologies and the skills that we need for exploration beyond planet Earth," Kennedy Director Bob Cabana said. "Testing out our spacecraft on a real mission instead of a pure test flight I think is very exciting. The team here at Kennedy, we're ready to get on board and make this happen. I'm very



NASA/Kim Shiflett

Kennedy Space Center Director Bob Cabana told workers the center will play a vital role in NASA's future plans March 10 at the Training Auditorium.

excited about this mission."

The overall budget proposal for NASA features \$2.3 billion for Kennedy projects and programs, including the Launch Services Program, Commercial Crew Program and Ground Systems Development and Operations Program.

The proposal is the first step in the budget process with Congress offering its own suggestions during the next few

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President's space exploration vision ahead of schedule

By Bob Granath
Spaceport News

On the third anniversary of President Obama's visit to Kennedy Space Center, where he set his space exploration vision for the future, news media representatives were given an opportunity to see up close the Orion spacecraft that could take astronauts on an asteroid sampling mission as early as 2021.

Key leaders from across the agency shared progress being made on the spacecraft and infrastructure that will send humans to the asteroid, and eventually to Mars. Orion currently is being prepared in Kennedy's Operations and Checkout Building (O&C) for its first flight test, Exploration Flight Test (EFT)-1, in 2014.

"Three years ago today, the

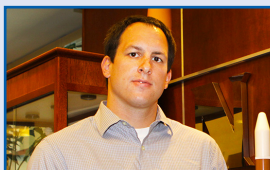
president was here in an empty high bay challenging us to go to an asteroid by 2025," said Bob Cabana, Kennedy director. "Today, this is a world-class production facility with a flight vehicle, Orion, getting ready to fly next year. We've made tremendous progress in our transition to the future."

Dan Dumbacher, deputy associate administrator for Exploration Systems Development; Mark Geyer, Orion program manager; Keith Heffner, Space Launch System (SLS) program planning and control manager; and Scott Colloredo, chief architect for the Ground Systems Development and Operations program, also discussed progress being made on final assembly and integration of Orion for the uncrewed

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Introducing engineering drives FIRST mentor

By Anna Heiney
Spaceport News

Growing up in Hartwell, Ga., Dustin Dyer never expected he'd someday be working for NASA.

"When I went off to school, I thought I wanted to be a structural engineer," Dyer recalled. But while attending undergraduate classes at the University of Georgia, he realized he wanted to go a different route. He followed his new course by enrolling in graduate school at Georgia Tech, where he specialized in control systems engineering. While there, he interviewed with Kennedy Space Center representatives at a career fair.

Dyer came to work for NASA in January 2008 and has supported a variety of programs, including space shuttle safety and mission assurance, International Space Station payload development, and engineering. Today he's a guidance, navigation



CLICK ON PHOTO

NASA/Jim Grossmann

Launch Services Program engineer Dustin Dyer says working with FIRST (For Inspiration and Recognition of Science and Technology) Robotics students gives him a chance to introduce them to the joys and challenges of engineering. Dyer oversees the software and control system effort for FIRST teams 1592 from Cocoa High and Holy Trinity Episcopal Academy. For more on the FIRST Robotics program, click on the photo.

and control systems engineer in the Launch Services Program.

A big part of his job is performing the computer simulations that verify and validate a rocket's expected performance on a given mission, using data supplied by the company providing the launch vehicle.

"They give us their design and their inputs, and we run independent simulations and compare, and whatever differences we find, we go off and explain," Dyer said. "That's one of the ways we put our stamp on design adequacy."

Dyer recently support-

ed the successful liftoff of the Landsat Data Continuity Mission, which launched Feb. 11 from Vandenberg Air Force Base in California aboard a United Launch Alliance Atlas V rocket.

Another of Dyer's roles in the Launch Services Program is serving as a mentor for high school students participating in FIRST Robotics. FIRST, short for "For Inspiration and Recognition of Science and Technology," organizes students into teams, with professional mentors to provide technical guidance. Dyer oversees the software

and control system effort for FIRST teams 1592 from Cocoa High School and Holy Trinity Episcopal Academy.

"We try to give the kids the freedom to come up with ideas," Dyer explained. "Then we start getting more involved with the actual engineering and development work."

Dyer pointed out that ninth- and 10th-graders often haven't yet taken more advanced courses, such as trigonometry, and need help making their ideas a reality. The team handles fabrication and assembly of its robot creation, and

operates it at the competition.

"We go with them and help them maintain the systems, but it's up to them to drive and win," Dyer said.

Working with the FIRST team is a creative outlet for Dyer, but more important is the opportunity to introduce students to the joys and challenges of engineering.

"You can see a lot of growth in a kid over four years or so," Dyer said. "It's just a great way for me to share my passion and, hopefully, give these kids a chance to steer toward a profession they'll love."

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months. The new fiscal year begins Oct. 1.

The centerpiece of the proposal is NASA's aim to capture an asteroid with a robotic craft and maneuver it into an orbit closer to Earth. Astronauts would launch in an Orion spacecraft aboard a Space Launch System rocket to collect samples and conduct firsthand research on the relocated asteroid.

The mission could take place

as soon as 2021, four years in advance of the goal set by President Barack Obama when he visited Kennedy in 2010 and challenged NASA to send astronauts to an asteroid by 2025.

Developing the rocket, spacecraft and in-space propulsion system needed to make the mission work involves aspects of processing, launch and research in which Kennedy specializes, Cabana said.

"Everything we're doing leads to making that successful,

we have a key role in all of it," Cabana said.

For example, the Orion spacecraft is being readied in the Operations and Checkout Building for a flight test in 2014 to check out the design's fitness.

Modifications for processing, ground support equipment and launch facilities for the Space Launch System rocket (SLS) are already far along and the proposal includes money to keep making the changes to complete the 21st century Space Launch

Complex concept.

The budget proposal includes about \$99 million for continued modifications to the VAB, plus about \$14 million for Launch Pad 39B, which is deep into its modifications schedule to accommodate the rocket, as well as those from commercial companies.

"We continue to make that pad not just to support SLS, but we also want to make it avail-

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flight test that will see the vehicle travel farther into space than any human spacecraft has gone in more than 30 years. The main objective of EFT-1 is to test Orion's heat shield at the high speeds generated during a return from deep space.

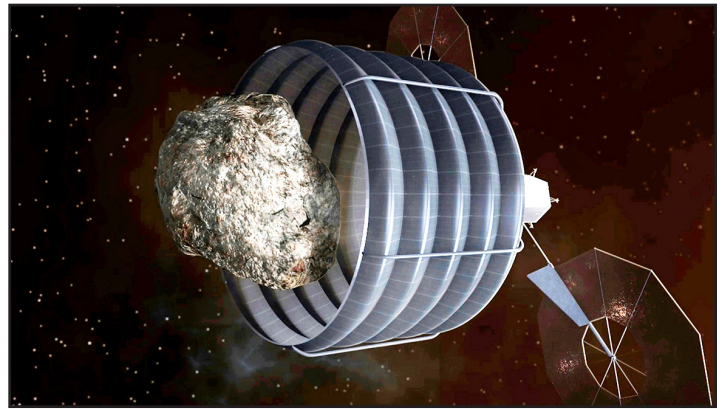
"What you see behind us is an example of that wonderful progress that has been made by the Orion team," said Dumbacher. "There is also great progress by the Space Launch System team getting the launch vehicle ready."

The president's Fiscal Year 2014 budget request for NASA

provides funding for an initiative to robotically capture an asteroid and redirect it to a stable orbit in the Earth-moon system. Astronauts then would launch in Orion aboard an SLS rocket to collect samples of and explore the relocated asteroid.

Designed to expand human presence and enable exploration of new destinations in the solar system, Orion and SLS are part of the president's goal to reach beyond where anyone has gone before.

"I believe it's more important to ramp up our capabilities to reach -- and operate at -- a series of increasingly demanding targets, while advancing our



CLICK ON PHOTO

NASA

A notional concept of a solar-electric powered spacecraft, designed to capture a small near-Earth asteroid and relocate it safely close to the Earth-moon system so astronauts can explore it. To see a video and learn more, click on the photo.



NASA/Jim Grossmann

Speaking on April 15, 2010, in the Operations and Checkout Building at Kennedy Space Center, President Barack Obama outlines the course his administration is charting for NASA and the future of U.S. leadership in human spaceflight. Behind him is a mock-up of an Orion spacecraft that could transport U.S. astronauts as early as 2017.

technological capabilities with each step forward," Obama said in his 2010 address at Kennedy. "And that's what this strategy does. And that's how we will ensure that our leadership in space is even stronger in this new century than it was in the last."

All of the Orion subsystems and components created around the country are coming together in the O&C. In the near future, the production team will apply heat-shielding thermal protection systems, avionics and other hardware to the spacecraft.

NASA's SLS will boost Orion off the planet on a test flight in 2017. It is designed to be flexible for launching spacecraft for crew and cargo missions.

"We are thrilled with this mission," Dumbacher said.

"We're looking forward to it. It will be a challenge, it will be complex. But NASA's up to the challenge and the team you see represented here is ready and willing to take it on."

The president's proposal is the first step in the budget process with Congress offering its own suggestions during the next few months.

The new fiscal year begins Oct. 1.

During the president's 2010 address at Kennedy, he spoke of the value of NASA's work.

"For pennies on the dollar, the space program has fueled jobs and entire industries," he said. "For pennies on the dollar, the space program has improved our lives, advanced our society, strengthened our economy, and inspired generations of Americans."

From **MISSION**, Page 2

able to support other commercial launch operations," Cabana said.

The Saturn V-class rocket will be stacked atop the mobile launcher inside the VAB and will launch from Pad 39B.

The SLS will make its first flight in 2017 with Orion for a shakedown flight test. Astronauts are slated to fly Orion for the first time in 2021. That mission could be the one that carries the crew to an asteroid, depending on how the plan progresses.

The Kennedy-based Commercial Crew Program (CCP) will keep working toward a 2017 milestone of its own, under

this year's budget proposal.

"You can see that the Commercial Crew Program is funded extremely well and that's crucial," Cabana said.

The budget plan calls for \$780 million for Kennedy's portion of the program. That amount will allow astronauts to begin flying on privately developed spacecraft and rockets in 2017, said Charles Bolden, NASA administrator.

The Launch Services Program (LSP) is slated for about \$77 million under the proposal. It will oversee several launches in the next fiscal year, starting with the Mars Atmosphere and Volatile Evolution Mission (MAVEN) spacecraft in November.

MAVEN is designed to orbit Mars and find out how and why the Martian atmosphere changed.

"Our Launch Services Program continues to be the backbone for providing our science missions to make NASA successful," Cabana said.

LSP also will be involved with a landing on Mars in 2020 by a scientific rover, which comes on the heels of the success of the Mars Science Laboratory Curiosity.

The asteroid exploration mission is expected to stretch across three of the agency's directorates and impact planning for a number of areas at Kennedy, Cabana said.

Trio of space shuttle astronauts inducted into Hall of Fame

By Bob Granath
Spaceport News

Space shuttle astronauts Bonnie Dunbar, Curt Brown and Eileen Collins joined an elite group of American space heroes as they were inducted into the U.S. Astronaut Hall of Fame on April 20, during a ceremony at the Kennedy Space Center Visitor Complex. They were welcomed to the ranks of legendary pioneers such as John Glenn, Neil Armstrong and Sally Ride – distinguished members of the Hall of Fame.

This induction is the twelfth group of space shuttle astronauts named to the Hall of Fame and the first time two women were inducted at the same time.

CNN's principal correspondent for coverage of NASA's space programs, John Zarrella, served as master of ceremonies and introduced the attending members of the U.S. Astronaut Hall of Fame as they came forward and took their seats on the stage. During his remarks, he honored Armstrong and Ride who died during the past year.

NASA Administrator and Hall of Fame astronaut Charlie Bolden noted that his fellow astronauts, including the Hall of Famers at the ceremony, all share a common vision.

"The people sitting on this stage had dreams when they came into this program," he said.

Bolden added that NASA now is working to continue those dreams, a theme that was echoed by those inducted during the Astronaut Hall of Fame ceremony.

"Going to the moon and then on to Mars will take a lot of effort," he said. "Today, for the first time in my lifetime, we're

on the precipice of being able to do that."

Kennedy Center Director Bob Cabana welcomed the trio of honorees back to the Florida spaceport.

"Much has changed here at the Kennedy Space Center since these people were flying on the space shuttle," said Cabana, also a Hall of Fame astronaut. "But one thing that hasn't changed is our desire to excel and explore beyond the bounds of planet Earth. We're now stepping up to meet the president's challenge to send astronauts to an asteroid."

Introduced first was Dunbar who was selected as a NASA astronaut in 1981. Inspired by the early efforts of the fledgling space agency of the late 1950s, Dunbar applied to be an astronaut at an early age.

"I did send a letter to NASA when I was about eight or nine," she said. "I was looking at the stars one night, it was a very clear crisp night . . . and I thought 'this is what I want to do with the rest of my life. This is what my passion is.'"

Dunbar expressed appreciation for the many people who helped her throughout her career to make her dreams come true.

"You never get anywhere without a lot of help," she said. "I had family, I had teachers, I had professors who helped along the way."

Dunbar now leads the University of Houston's STEM (science, technology, engineering and math) Center and joined the faculty of the Cullen College of Engineering.

"Now I have an opportunity to give back," she said. "Part of that giving back is to ensure we keep our vision forward and that we continue to explore."

A five-time spaceflight



CLICK ON PHOTO

Space shuttle astronauts, from left, Bonnie Dunbar, Curt Brown and Eileen Collins stand together after being inducted into the U.S. Astronaut Hall of Fame at the Kennedy Space Center Visitor Complex. To learn more about the U.S. Astronaut Hall of Fame, click on the photo.

NASA/Kim Shiflett

veteran, she served as a mission specialist on STS-61A, STS-32, STS-50, STS-71 and STS-89.

All totaled, she logged more than 50 days in space. Following her retirement from NASA in 2005, Dunbar served as president of The

Museum of Flight until assuming her current role.

Like Dunbar, Brown began thinking of a career at an early age. "As far back as I can remember as a kid, I wanted to fly. Flying was my passion," Brown said.

He also spoke of having a vision for reaching goals.

"Dreams are very, very important," Brown said. "Dreams are what made this country great. Dreams are what made NASA such a great institution and dreams

continue to make this nation great. Our dreams determine who we are and what we do in life. Never think and never believe that your vision will not come true."

Brown began his career with NASA in 1987. He went on to fly

six space missions, spending over 57 days in space. Brown's shuttle missions include serving as pilot on STS-47, STS-66 and STS-77, and commanding STS-85, STS-95 and STS-103. The STS-95 mission aboard Discovery in 1998 was one of the most memorable as the flight that included Astronaut Hall of Fame charter member Glenn.

Collins expressed appreciation to those who set an example in her life, at home and in her career.

"My mom and dad, they were my heroes," she said.

Collins also thanked Cabana, who was chief of the Astronaut Office during her tenure, and the women astronauts who served before her for being outstanding role models.

She now works to inspire others.

"We live in such a great country with such great opportunities," she said. "I like to talk to young people about STEM. There are many opportunities out there."

Collins was selected to be an astronaut in 1992. The first woman to pilot and command a spacecraft, she also is a



NASA/Kim Shiflett

NASA Administrator Charles Bolden speaks at the ceremony during which Bonnie Dunbar, Curt Brown and Eileen Collins were inducted into the U.S. Astronaut Hall of Fame at the Kennedy Space Center Visitor Complex on April 20.

retired U.S. Air Force colonel. Her accomplishments on four spaceflights include serving as pilot on STS-63, STS-84, and commanding STS-93 and the return-to-flight mission following the loss of the shuttle Columbia, STS-114. Collins has logged more than 38 days in space. She retired from NASA in 2006.



Twenty-six members of the U.S. Astronaut Hall of Fame stand together after Bonnie Dunbar, Curt Brown and Eileen Collins were inducted into the elite group at the Kennedy Space Center Visitor Complex.

NASA/Kim Shiflett

Enthusiasts converge for Space Apps challenge

By Linda Herridge
Spaceport News

Astronauts traveling to an asteroid near the moon, to Mars or other near-Earth locations may have a stop off point to gather fresh fruits and vegetables to sustain them during their space voyage.

A design concept for a space-based greenhouse called the Deployable Independent Greenhouse System (DIGS), which could be stationed near the moon, was selected as the top winner of the 2013 International Space Apps Challenge (ISAC) from Kennedy Space Center. It also received "People's Choice" recognition. The event was part of the worldwide ISAC on April 20 and 21.

The event at the Center for Space Education at Kennedy's visitor complex brought NASA engineers and scientists together with 21 professionals and students from a variety of non-NASA backgrounds to solve challenges relevant to improving life on Earth and in space. Kennedy was the first NASA center to host the challenge.

Worldwide, more than 9,000 people and 484 organizations came together in 83 cities across 44 countries, as well as online, to participate. When the event came to an end Sunday, there were more than 750 solutions submitted for 58 challenges.

Kennedy's winning presentation in the Deployable Greenhouse



NASA/Charisse Nahser

Students from the University of Florida, University of Central Florida and University of Puerto Rico brainstorm ideas for the Moonville Lunar -- Industry Game challenge during the 2013 International Space Apps Challenge on April 20 at the Kennedy Space Center Visitor Complex's Center for Space Education. At right, is Dr. Phil Metzger, a physicist in Kennedy's Swampworks, who served as a subject-matter expert.

More online

For more information about the International Space Apps Challenge at Kennedy, visit <http://spaceappsksc.tumblr.com>. For more information at the International Space Apps Challenge, visit <http://spaceappschallenge.org>.

challenge came from a diverse group of people with different backgrounds: Jamie Szafran, a developer in the Launch Control Systems Project in the Ground Systems Development and Operation Program; Jessica King, an employee from Valencia College; Pat Starace, an animator and mobile application developer from Orlando; and Mike King, an audiovisual design engineer from Orlando. The DIG team brainstormed with others online and a Kennedy subject-matter expert on the greenhouse design. They also analyzed how it would be deployed into space before presenting their concept to a panel of three judges.

The group earned the

opportunity to return to the center for a launch.

"We designed a greenhouse for astronauts traveling to the moon, Mars or near-Earth objects to collect fresh produce," Szafran said. "We were under quite a bit of time constraint with about 23 hours to do the work, so it was exciting. It feels great to win."

Caley Burke, an engineer in the Launch Services Program and coordinator of Kennedy's event, said the Space Apps Challenge brings participants with diverse skills and backgrounds together, across the world, to develop new ways of solving challenges that NASA faces.

"People from all walks of life with a passion for space were given the

opportunity to 'work for NASA' for the weekend," Burke said. "Their solutions may revolutionize how NASA approaches a challenge."

The three other teams at Kennedy worked on Kennedy Space Center Spaceport 2040, Seven Minutes of Science, and Moonville -- Lunar Industry Game.

The Seven Minutes of Science challenge team was named the runner-up. Kennedy's winner and runner-up entries will go on to the global competition, where the Best in Class will be announced on May 22.

Dr. Phil Metzger, a physicist at Kennedy's Swampworks, and Tracy Gill of the Research and Technology office of Kennedy's Center Planning and Development Directorate were among five subject-matter experts who met with Kennedy participants and answered questions that helped guide them in

their selected challenge topics. They also communicated with participants virtually around the world.

"It was exciting to be a part of this event," Metzger said. "I'm a strong believer in crowd sourcing."

Brandon Morel of Orlando and Samantha Messer of Jacksonville, worked on the Kennedy Space Center Spaceport 2040 challenge. They participated in the challenge because of their interest in the future of space travel.

"When will I ever again have this unique opportunity to share my ideas about the space center of the future?" Morel said.

"This topic is relevant to us as residents of Florida," Messer commented.

The judges were Luke Roberson from Kennedy's Engineering Directorate; Robert Hubbard, business development manager in Kennedy's Center Planning and Development Directorate; and Sean Mondesire, from A Little Evil Technology in Orlando.

A summary of all projects for Kennedy challenges will be reviewed by teams from the center and ideas from the projects will be shared with Kennedy management to consider as potential center and project improvements. The management team will review the concepts and evaluate them to determine if implementation is possible.

Rescued eaglet returned to nest box

By Bob Granath
Spaceport News

When a strong thunderstorm recently blew through Kennedy Space Center, two eagles landed -- falling to the ground along with their nest. Fortunately, ecologists at the spaceport, who take great care to track the birds and protect their habitat, stepped in and rescued the eaglets, who were believed to be six to seven weeks old.

Kennedy is a nesting area for numerous bald eagles. Space center employees and visitors alike enjoy watching their majestic flights overhead. In addition to being the national bird of the United States, bald eagles have been a popular image on a dozen mission patches for American human space-flights.

"We do a survey of the eagle nesting areas about three times a year," said Becky Bolt, a wildlife ecologist with InoMedic Health Applications (IHA) Inc. "A couple of days after the big storm, we found three eagle nests had been blown to the ground. One had an eaglet standing in the nest. We then spotted another lying on the ground, about 100 yards away."

IHA is NASA's Medical and Environmental Support contractor at Kennedy.

The two eaglets found March 26 south of Kennedy's Vehicle Assembly Building (VAB) and north of Schwartz Road, were east of Kennedy Parkway.

The thunderstorm that passed through the Space Coast on the afternoon of March 24 lasted less than 30 minutes, but it pounded the area with heavy rain, hail and winds exceeding 60 miles per hour.

"It was easy to see how that would blow the nest to the



CLICK ON PHOTO

Photo courtesy of Russ Lowers/IHA

An uninjured eaglet is returned to a nest box in a pine tree near where he was found by Jim Lott, an arborist from the Audubon Center after the March 24 storm. The nest box was built using a wood frame and wire mesh and is filled with twigs and straw.

ground," said Lynne Phillips, a physical scientist in the Environmental Management Branch of Center Operations.

Phillips pointed out that the eaglets were not yet mature enough to fly.

"A bird that can't fly is helpless," she said. "While there are predators, such as bobcats, that could have threatened the eaglets, their main problem was dehydration. Fortunately, neither eaglet had any broken bones."

With the assistance of others from IHA and the Merritt Island National Wildlife Refuge, both birds were collected and taken to the Audubon Center for Birds of Prey in Maitland, Fla. The center provides medical treatment, rehabilitation and release of Florida's raptors.

Two days after the rescue, one eaglet was returned to the area where he was found.

A nest box was built with a wood frame, wire mesh in the

bottom and filled with twigs and straw.

"We placed him in a pine tree near where the original nest was located," Bolt said.

The second eaglet remains at the Audubon Center where treatment continues for an eye problem.

"The Audubon Center's vet doesn't think the eye was injured in the fall, and the problem may be due to an illness or disease," Bolt said. "We want him to be able to fly before being released. We hope that we will be able to release him in the next few weeks."

Wildlife experts note that the ability to fly is a key to survival for eagles or other birds living in the wild.

"Before they can fly, a bird can't escape predators, or find food and water," Bolt said. "Once fledgling eagles learn to fly, their parents will lead them to the river and show them how to catch fish. They learn by watching what other eagles do."

Ecologists at Kennedy have plenty of opportunities to track the activities of local bald eagles. The 140,000 acre Merritt Island National Wildlife Refuge includes fresh-water impoundments, salt-water estuaries and brackish marshes. The diverse landscape provides habitat for more than 310 species of birds, 25 mammals, 117 fishes, and 65 amphibians and reptiles including species such as wood storks, Florida scrub jays, Atlantic loggerhead and leatherback turtles, ospreys and alligators.

Eagles usually nest in the area from September to late April or early May.

"We average about 14 to 15 eagle nests each year," Bolt said. "The same pair of eagles usually returns to the same nest. The one along Kennedy Parkway, south of the VAB has been there as long as anyone can remember."

Spotlight on Commercial Crew Development

SpaceX Dragon/Falcon 9

The NASA Partner Integration Team (PIT Crew) working with Space Exploration Technologies (SpaceX) on the company's Falcon 9 rocket and Dragon spacecraft combination recently talked about spacecraft propulsion and parachute systems.

Later this month, the PIT Crew will travel to McGregor, Texas, for a SuperDraco abort engine test. Plans call for eight SuperDracos to be built into the sidewalls of the Dragon spacecraft, allowing a crew to escape from danger at any point of launch.



Sierra Nevada Corp. Dream Chaser/Atlas V

Sierra Nevada Corp. (SNC) Space Systems put the Engineering Test Article of its Dream Chaser through a Ground Resonance Test at the company's facilities. The testing is standard for aircraft and helicopters and confirms that vibrations from machinery inside the craft won't make it shake itself apart. Wind tunnel testing continues following a recent test readiness review. The testing, also scheduled for May and June, is tied to one of the milestones SNC will meet to reduce risk in spacecraft designs.



Scenes Around Kennedy Space Center



Members of the Kennedy Space Center Running Club and other Kennedy workers offer a moment of silence to honor those affected by the recent terrorist attacks in Boston. The group gathered April 18 and also walked a lap at the Operations and Checkout Building running track. Other signs of support for those affected last week were shown as Kennedy workers wore their favorite running shirts to work and flags at the center were flown at half-staff.



Technicians work on the payload fairing April 15 that will protect NASA's IRIS spacecraft during launch aboard an Orbital Sciences Pegasus XL rocket at Vandenberg Air Force Base in California. For more on the mission, click on the photo.



A bobcat is on the prowl at Kennedy Space Center on April 6. The Merritt Island National Wildlife Refuge (MINWR) manages Kennedy's unincorporated areas. The refuge is hosting a photo presentation, "Bobcats of the Refuge," at 1 p.m. Thursday, April 25 at the MINWR Visitor Center on State Road 402. Join MINWR volunteers and staff to conduct a butterfly survey at 9 a.m. Saturday, April 27. No experience is necessary. Bring water, snacks, insect repellent, and wear closed shoes and long pants. Call 321-861-5601 for reservations. For more on the MINWR, click on the photo.



A crane lifts a segment for a set of twin, full-size solid rocket booster (SRB) replicas in front of the shuttle Atlantis exhibit under construction at the Kennedy Space Center Visitor Complex on April 11. An external tank replica will be added later between the SRBs. The SRBs stand 150 feet tall, while the external tank will reach 184 feet when it is finished. For the latest on the exhibit, click the photo.



Engineers and technicians use an aerial lift to work on one of three large antennas at the Ka-Band Objects Observation and Monitoring (Ka-BOOM) site in the Industrial Area on April 12.

Special leadership program selects engineers

By Bob Granath
Spaceport News

Two NASA engineers from the Kennedy Space Center's Engineering and Technology Directorate recently were selected by the Asian-American Governments Executives Network (AAGEN), to participate in a special leadership program. They will join 18 participants from other federal agencies across the nation.

Johnny Nguyen, chief of the Fluids Test and Technology Development Branch, and Khoa Vo, technical integration manager for the Control and Data Systems Division, were selected for the year-long Senior Executive Services (SES) development course.

The program is sponsored by AAGEN with participation by the White House Initiative on Asian-American and Pacific Islanders, the Office of Personnel Management and the Equal Employment Opportunity Commission.

"It's an opportunity to be mentored and learn from some of the most experienced federal leaders," Vo said. "It's exciting to be chosen."

Nguyen agreed that it is an honor to be selected.

"I'm looking forward to the sessions," he said. "I know there is going to be some homework."

Founded in 1993, AAGEN is a non-profit, non-partisan organization of top Asian-American, Pacific Islander career and appointed executives in the federal, state and local governments. The



NASA/Bob Granath

Johnny Nguyen, chief of Kennedy Space Center's Fluids Test and Technology Development Branch, left, and Khoa Vo, technical integration manager for Kennedy's Control and Data Systems Division, were selected for the Senior Executive Services (SES) leadership development program.

SES development program curriculum consists of two to three days of class work in Washington, D.C., once each quarter. The sessions include speakers, networking and classes focusing on personal branding, risk taking, communication and building trust as a professional.

Vo said he believes the SES program will be personally valuable, but also allow him and Nguyen to add value to NASA.

"The program should help us continue to grow and be more effective and better equipped as leaders," he said. "That will better position us to

help the agency."

Nguyen also is looking forward to the program.

"It should be an opportunity to learn new leadership skills and better understand how the federal government works," he said.

A Space Coast native, Nguyen grew up in Port St. John, Fla., and attended Titusville High School.

"In 2001, I graduated from the University of Central Florida (UCF) with a degree in mechanical engineering," he said. "I started working for NASA at Kennedy as a co-op in 1998 while I was going to school."

Nguyen went on to earn a Master of Business Administration from UCF in 2004. He now manages personnel, resources and technical skills to ensure that technology activities support all programs and projects for fluids technology development at the space center.

"It's exciting work," he said. "Space exploration improves life on Earth, and our work is part of that mission."

Vo immigrated to the United States from Vietnam as a teenager and now lives in Orlando.

"I studied computer science at UCF, graduat-

ing in 1998," he said. "I went to work for Lockheed Martin the next year."

He was a software engineer for Lockheed Martin and United Space Alliance before going to work for NASA in 2004.

Vo also earned a master's degree in software engineering in 2006.

Today, Vo leads and coordinates the Engineering and Technology Directorate's implementation of the safety-critical command and control capabilities that are required for reestablishing our nation's ability to launch humans into space.

Like Nguyen, Vo appreciates his job with the space agency.

"It's an opportunity to help define where we go in the future," he said. "We're currently in a transition phase. Now is the time to make a difference because what we do now will have an impact for decades to come."

Both Nguyen and Vo believe the SES development program will aid in helping define NASA's direction.

"I hope to get some insights into some of the struggles other agencies are facing and some of the things that have been successful," Nguyen said. "Hopefully, I will learn best practices to bring back to NASA."

"We will use these to learn and share other perspectives," Vo said. "That will make us mindful of big pictures and issues that are affecting our federal government and learn more about applying diverse approaches and opinions."

Lunar exploration workshop highlights ideas

By Linda Herridge
Spaceport News

Engineers and researchers from Kennedy Space Center and other organizations and companies around the country recently discussed innovative ideas on the best ways to mine for resources on the moon and the steps necessary to achieve them.

They heard from subject-matter experts on more than 50 related topics and exchanged information during the Third International Workshop for Lunar Superconductor Applications, held April 9-10, and a LunarCubes Briefing, held April 11, in Cocoa Beach, Fla.

Workshop organizers Bonnie Dubrow and Russell Cox, both with Flexure Engineering in College Park, Md., welcomed participants in the room and many others participating on the Web from other locations.

"During the next three days you will be listening to some of the leaders, the scientists and engineers, who are actually paving the way for what's new in the world," Dubrow said.

Cox told attendees that there's been more interest in the moon in the last 10 years than any time since the 1960s. He said there are a lot of maturing pieces of technology and mission concepts coming about.

"Superconductor technology is going to be one of the most important technologies of lunar exploration," Cox said. "It is going to open up the frontier in a way that has never before been possible."

"We are at the beginning of a new renaissance in space. We are moving from 'gee could we do that' into 'how are we going to do that.'"

Pat Simpkins, director of Engineering and Technology at Kennedy, updated the group on activities at the center. "Kennedy is up to so much more than launching rockets," Simpkins said. "We definitely are not out of business."

His presentation focused on the work the center is doing to support NASA's priorities, including the Launch Services, Commercial Crew, the Ground Systems Development and Operations programs, as well as the Space Launch System, the Orion multi-purpose crew vehicle and Advanced Exploration Systems.

While NASA announced it will send humans to an asteroid by as early as 2021, and step up efforts to improve detection and characterization of asteroids, other technologies are being developed to explore the moon.

"The future of NASA and Kennedy is bright," Simpkins said.

Bill Larson, retired NASA In-Situ Resource Utilization (ISRU) project manager, shared information about space resources and the major areas of ISRU when considering developing a base on the moon. These include resource characterization, mission consumable production, civil engineering and surface construction, manufacturing and repair, energy generation, and storage and

transfer.

Larson said NASA's Aerospace Exploration Systems Program is moving forward with the Regolith and Environment Science and Oxygen and Lunar Volatile Extraction (RESOLVE) lunar ice prospector that would, in the future, explore the moon. RESOLVE prototypes have been tested near the volcanic area of Mauna Kea in Hawaii, a rocky, desolate area that mimics the moon's surface.

ISRU is important, Larson said, because it can help to reduce mass and cost, expand human presence in space, solve terrestrial challenges, enable space commercialization, and provide risk reduction and flexibility.

Larson said no single process for technology is the best. Development of two or more approaches is most likely to ensure success.

"We are trying to work on the core technologies that will allow us to get to any destination that is selected," Larson said. "In 2020, we hope to have an ISRU demonstration payload on Mars that supports the current human design reference mission. However, if RESOLVE hits the mother load of water on the moon, then maybe

that changes our thoughts on a Mars exploration architecture."

Rob Mueller, senior technologist in the Surface Systems Office of Kennedy's Engineering and Technology Directorate, presented "Mining Resources in the Moon's Permanently Shadowed Craters."

Mueller said one of NASA's goals is to extend and sustain human activity across the solar system. Some of the key technologies needed to achieve this include robotics and automation, power systems, habitation life support, and space resource utilization.

"We know there's water out there in the solar system and we know it's vastly more water than we have here on Earth," Mueller said. "You could argue that Earth is resource-constrained and we're starting to feel the effects."

During the last 10 years, missions to the moon have revealed locations where ice water could be located beneath the surface. The moon is not flat, but has permanently shadowed craters at the north and south poles that hold ice water and volatiles.

"The moon's Shackleton crater at the South Pole is a very compelling target," Mueller said. "Researchers think that up to 22 percent of the surface content could be water ice."

Extreme access will be required on these missions into the permanently shadowed regions of the moon, Mueller said. There are hundreds of small craters at the moon's North Pole, and there is data that shows they might contain up to 600 million metric tons of water ice.

Mueller said space mining requires access, resource excavation, extraction, and then some level of processing.



CLICK ON PHOTO

NASA/Jim Grossmann

Pat Simpkins, director of Engineering and Technology at Kennedy Space Center, addresses participants during the Third International Workshop on Lunar Superconductor Applications on April 9. For information about Lunar Superconductor Applications, click on the photo.

Looking up and ahead . . .

** All times are Eastern*

2013

April 24

Mission: ISS Resupply

Launch Vehicle: ISS Progress 51

Launch Site: Baikonur Cosmodrome, Kazakhstan

Description: Progress 51 will carry supplies, hardware, fuel and water to the ISS.

May 28

Assembly Flight: 35S

Mission: Expedition 36/37

Launch Vehicle: Soyuz TMA-09M

Launch Site: Baikonur Cosmodrome, Kazakhstan

Launch Window: 4:31 p.m.

Description: Soyuz TMA-09M will carry three Expedition 36/37 crew members to the ISS.

June 5

Mission: ISS Automated Transfer Vehicle 4

Launch Vehicle: Ariane 5

Launch Site: Guiana Space Centre, French Guiana

Launch Pad: ELA-3

Description: The European Space Agency's ATV-4, also known as the "Albert Einstein," will deliver several tons of supplies to the ISS, docking June 15 with the Zvezda Service Module on the Russian segment of the station.

June 26 All launch vehicle, spacecraft and integration activities will continue to protect for a launch date of May 28.

Mission: Interface Region Imaging Spectrograph (IRIS)

Launch Window: 10:29:57 p.m. to 10:33:57 p.m.

Launch Vehicle: Pegasus XL

Launch Site: Vandenberg Air Force Base, Calif.

Description: IRIS is designed to provide significant new information to increase our understanding of energy transport into the corona and solar wind and provide an archetype for all stellar atmospheres.

To watch a NASA launch online, go to <http://www.nasa.gov/ntv>.

NASA Spinoffs: Did you know?

With baseball season in full swing, take a look at how a few NASA spinoffs have changed the way "America's Pastime" is played.



Technology developed at Ames Research Center to take high-resolution imagery on Mars is now being used in baseball stadiums across the country. Fans navigate the in-game photos that capture nearly the whole stadium online and tag themselves and their friends using social media tools.

NASA collaborated in research that developed liquid metal alloys with the elasticity of plastics and twice the strength of titanium. The material appears in numerous products, including baseball bats. The alloys take the shape of impressed objects but return to their original shape.



NASA technology has led to the invention of Temper Foam, which is used in batting helmets and catchers' equipment. The key to shock reduction is a high-tech interior padding developed at Ames Research Center to protect astronauts from the forces experienced during liftoff.

NASA developed a Video Image Stabilization and Registration technology that was the basis for a Video Analyst System (VAS) for the FBI to analyze video images from hand-held camcorders at night. VAS is used in baseball to give video contrasts and comparisons of a batter's technique.



For more about NASA Spinoffs, go to <http://www.nasa.gov/spinoffs>.

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"Solar system resource utilization is the key to expanding civilization off Earth," Mueller said.

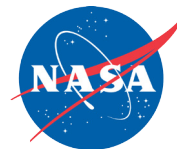
"The solar system has vast amounts of resources, but there's a catch. They must be acquired and processed to be useful. Our job is to figure out how to do that.

"Asteroids have huge amounts of resources in the Asteroid Belt and so do near-Earth asteroids. The lunar poles also are showing evidence of volatiles as is Mars," Mueller added. "We need to develop the technologies to extract these

resources, but accessing the permanently shadowed regions of the craters is going to be hard and harsh."

"How very fortunate it is that we have all of this amazing technology," Dubrow said.

Other presentations from Kennedy's Engineering and Technology Directorate included "Cryogenics in Space" from cryogenic engineer William Nortonato, and "Cryogenics and Energy at the Extremes," by James Fesmire, senior engineer and co-founder of Kennedy's Cryogenics Testbed Laboratory. A second presentation from Larson focused on "RESOLVE: NASA's Lunar Ice Prospector."



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